The Role of Clean Fuels and Clean Vehicles in Meeting Air Quality Standards

Dean K. Saito
South Coast Air Quality Management District

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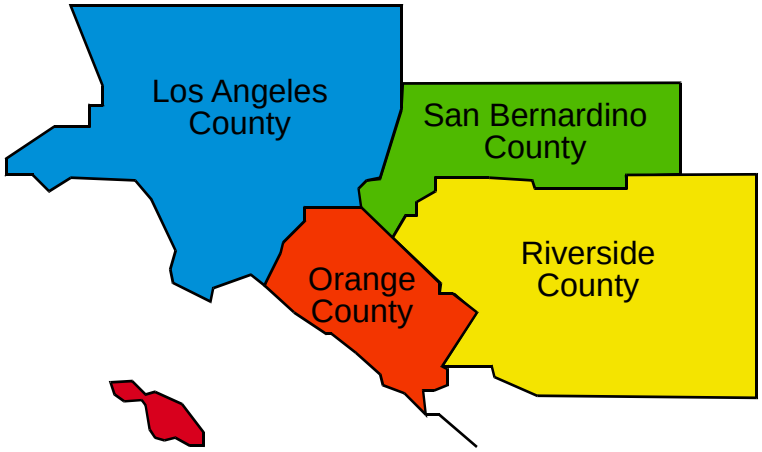
SCAQMD Background Setting

- South Coast Air Basin
  - 4-county region
  - ~16.5 million people
  - ~270,000 diesel vehicles
  - ~11.5 million gasoline vehicles
  - 13-member Governing Board

    10 elected / 3 appointed by elected officials



Public Health Issues

- Respiratory Disease
  - Ozone and fine particulates; NOx is precursor to both
- Cancer Risk, chiefly from diesel exhaust
- Children's Health, especially asthma spike
- Environmental Justice
  - Disproportionate community impacts

Recent Assessment of PM Health Effects

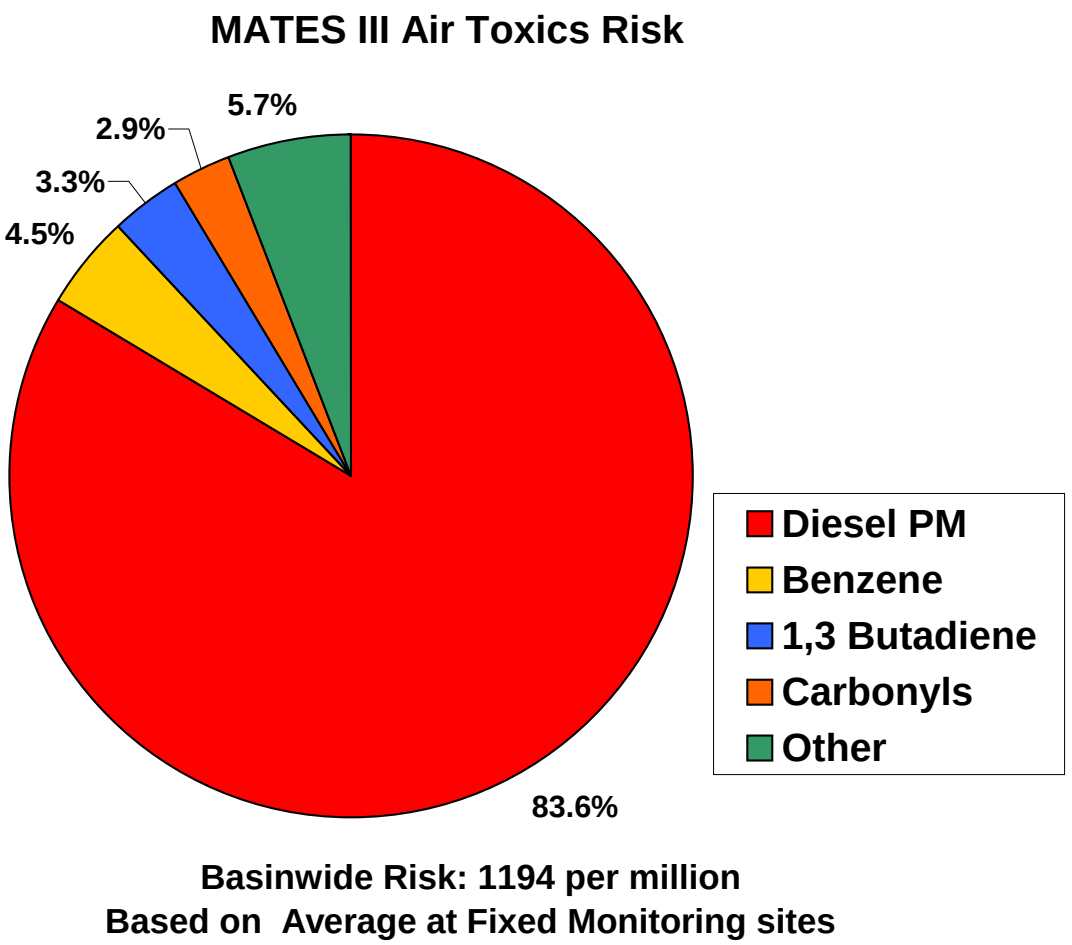
- 6,200 Premature Deaths/yr**
- 2,400 Hospitalizations/yr*
- 140,000 Asthma & Lower Respiratory Symptoms/Yr*
- 980,000 Lost Workdays/Yr*
- 5,000,000 Minor Restricted Activity Days*

*1999-2000 South Coast Air Quality Data

**Source: California Air Resources Board (2008)

Estimated Air Toxics Risk Based on Monitoring Data

- General trend is down for air toxics levels
- Estimated basin wide lifetime risk 1,200 per million
- Mobile source toxics account for 94% of risk
- Diesel accounts for 84% of air toxics risk
- Non-diesel risk lower by 50%



Federal Attainment Status of the South Coast Air Basin

- Ozone ☐
- PM2.5 ☐
- Carbon Monoxide ☑
- Nitrogen Dioxide ☑
- Sulfur Dioxide ☑
- Lead* ☑

* U.S. EPA Proposing New Lead Standards, Which May Place Basin in Nonattainment

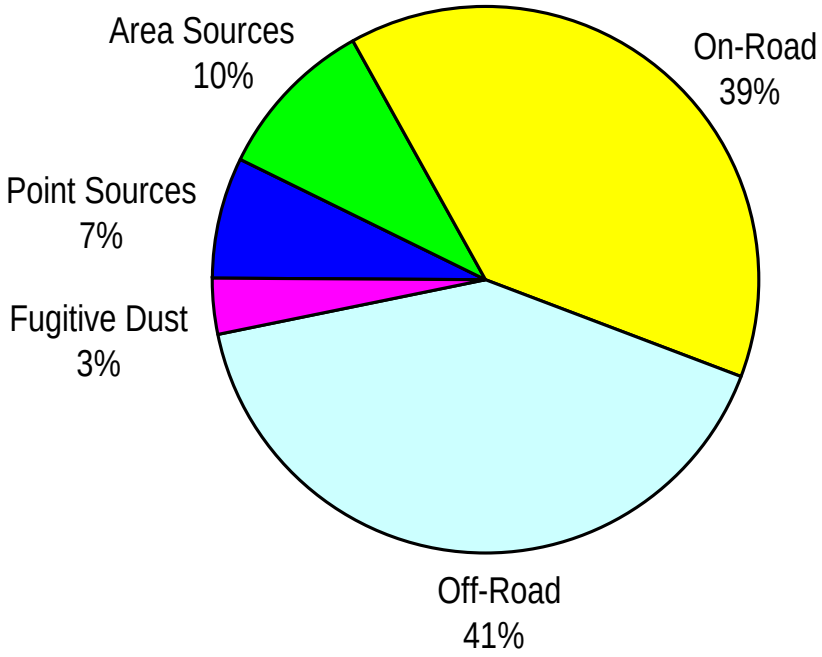
The Challenge

The Challenge

- Significant Reductions Needed for Attainment
- Continued Underestimation of Mobile Source Inventories
- Need for Controls on Federal Sources
- Goods Movement Growth
- 6 Years To Attain PM2.5 (No Margin of Error)
- “Black Box” Measures Between 2015 and 2024
- Incentive/Grant Funding
- Actions Needed NOW

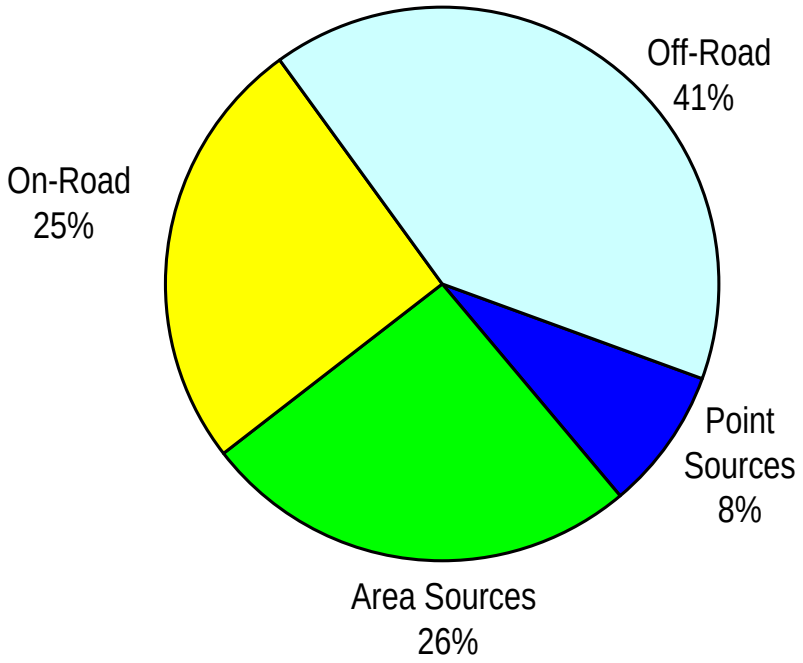
Emissions by Major Category

PM2.5, 2014



(NOx, SOx, PM2.5)

8-Hr Ozone, 2023

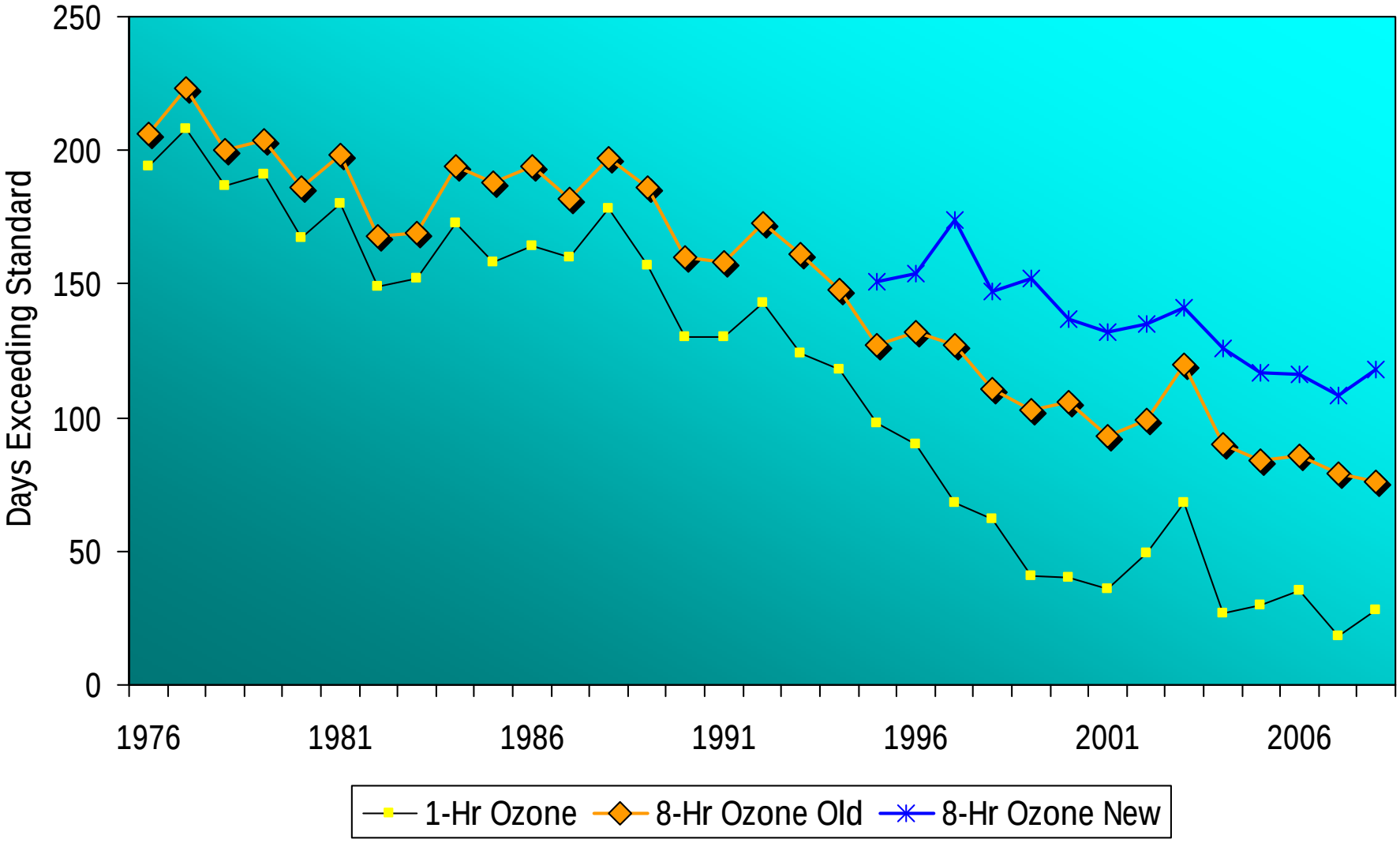


(VOC, NOx)

Key Air Quality Challenges

- "Easy" Reductions Achieved
- New 8-hour Ozone & PM 2.5 Standards
- Local Cancer Risks
- Goods Movement Sources
  - Marine Vessels, Locomotives, Aircraft, On-Road Trucks . . .

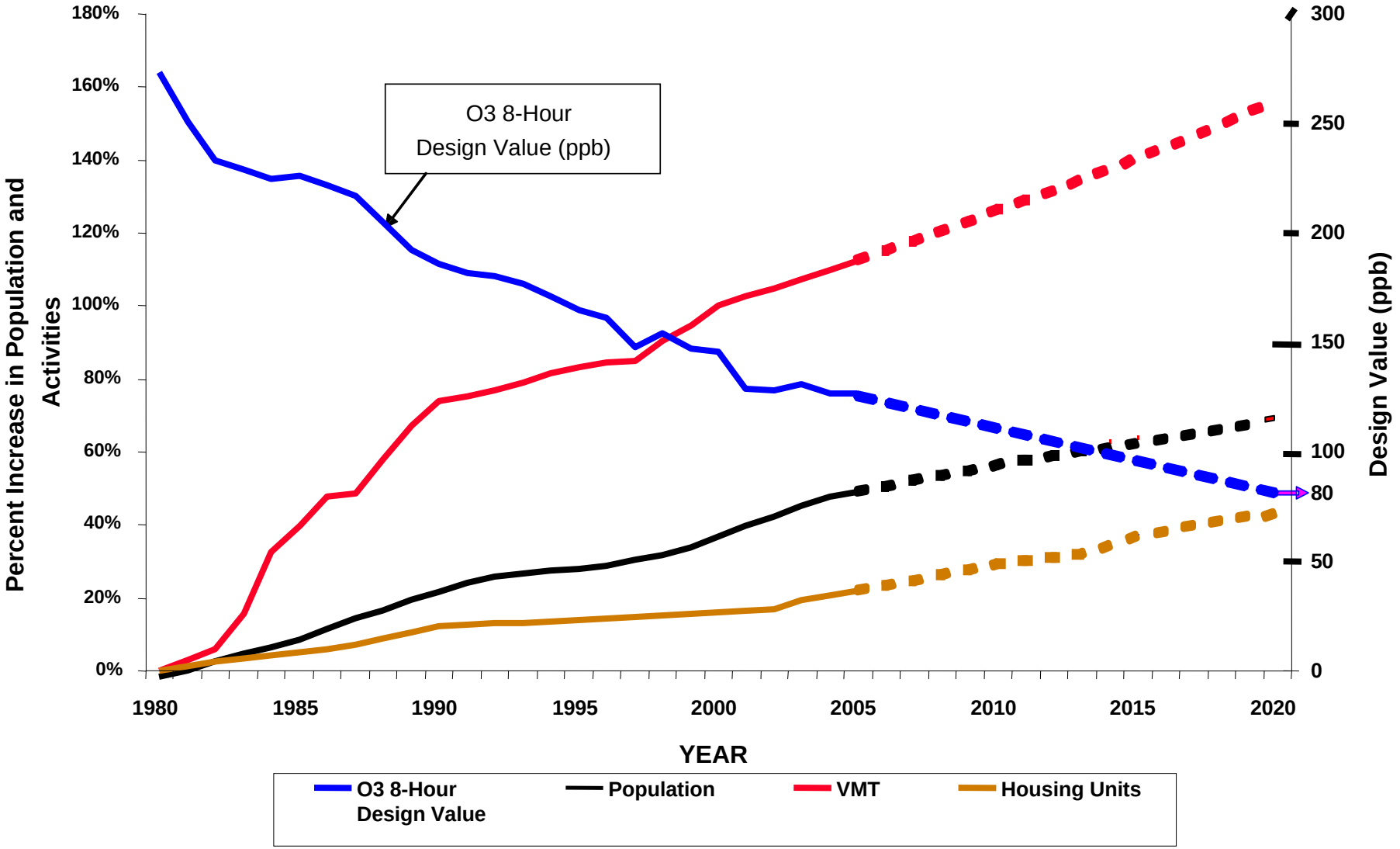
8-hr Ozone Air Quality Trends



Attainment Dates

- Annual PM2.5 2014
- 24-Hr PM2.5 ~2020
- 8-Hour Ozone (Old) 2023
- 8-Hour Ozone (New) ~2030

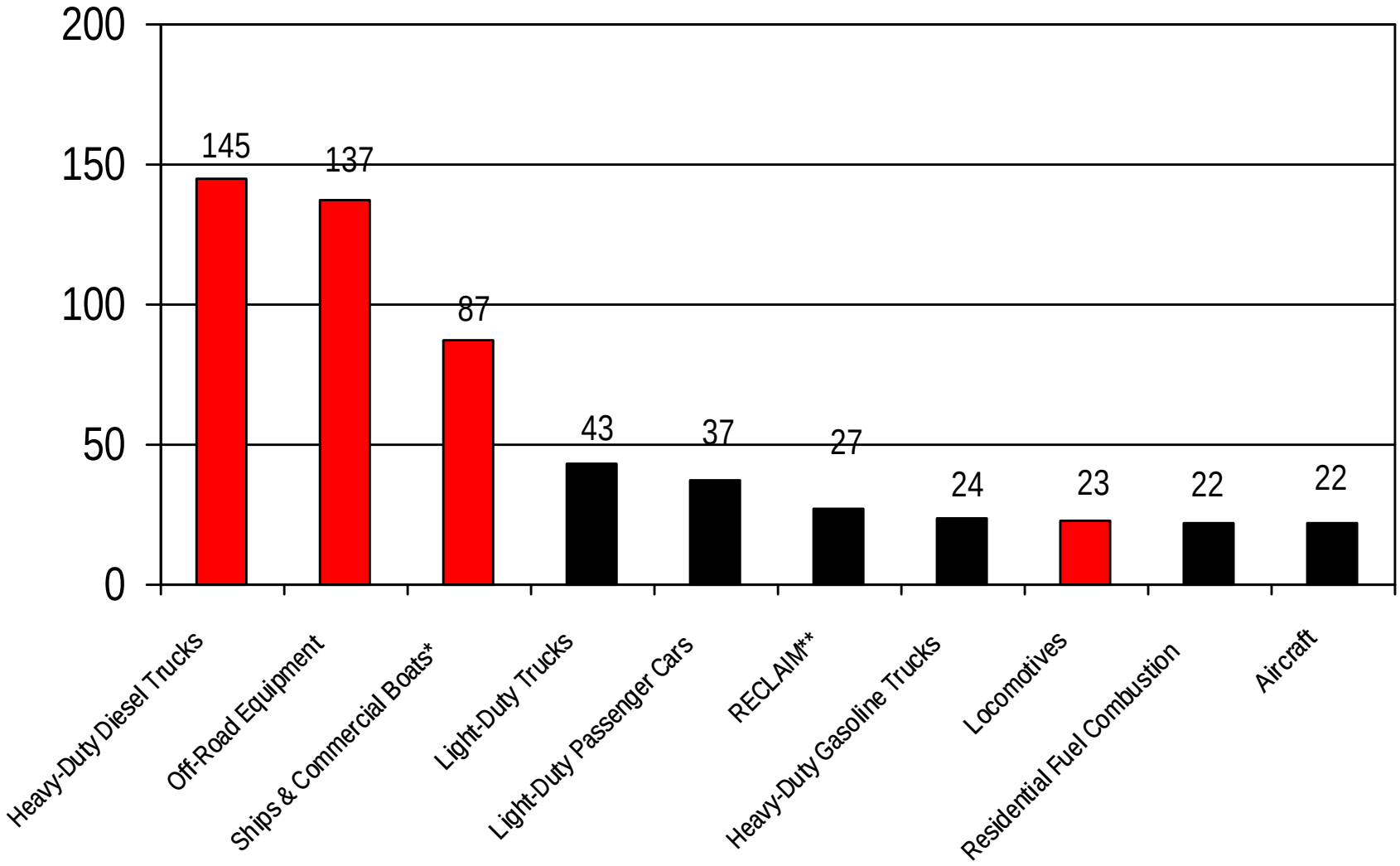
Demographic Projections and Ozone Air Quality Trend



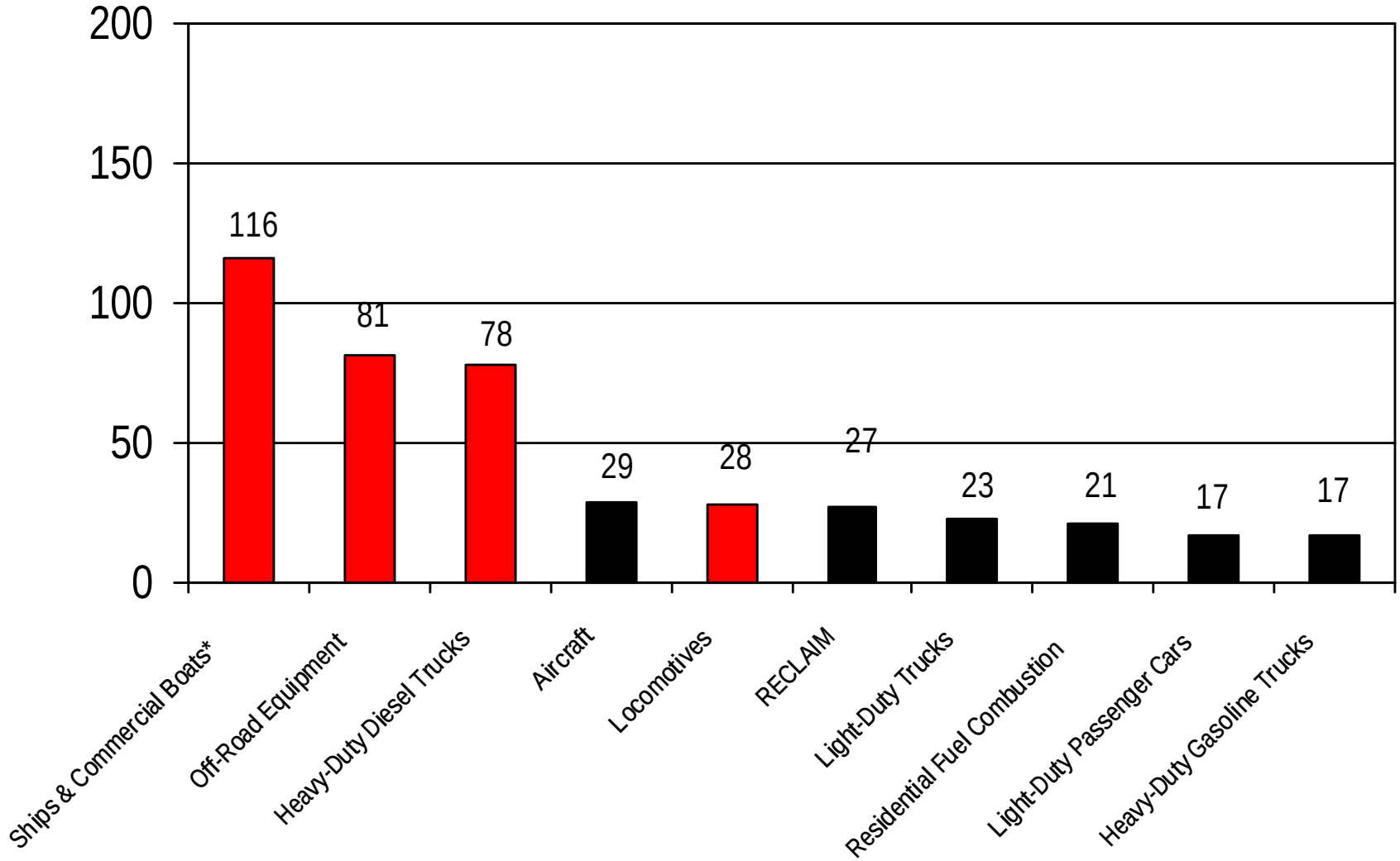
Goods Movement Growth 2001-2020

- 300% Increase In Cargo Through The Ports
- 170% Increase In Truck Travel
- 150% Increase In Rail Cargo

Top Ten NOx Source Categories (2014)



Top Ten NOx Source Categories (2023)



Challenges to Attainment/ Reducing Air Toxics Levels

- Long life of existing diesel engines
- Development of future control measures to meet new Federal / State clean air goals
- International / National versus Local needs
- Funding to implement new technologies

How South Coast Looks at Diesel

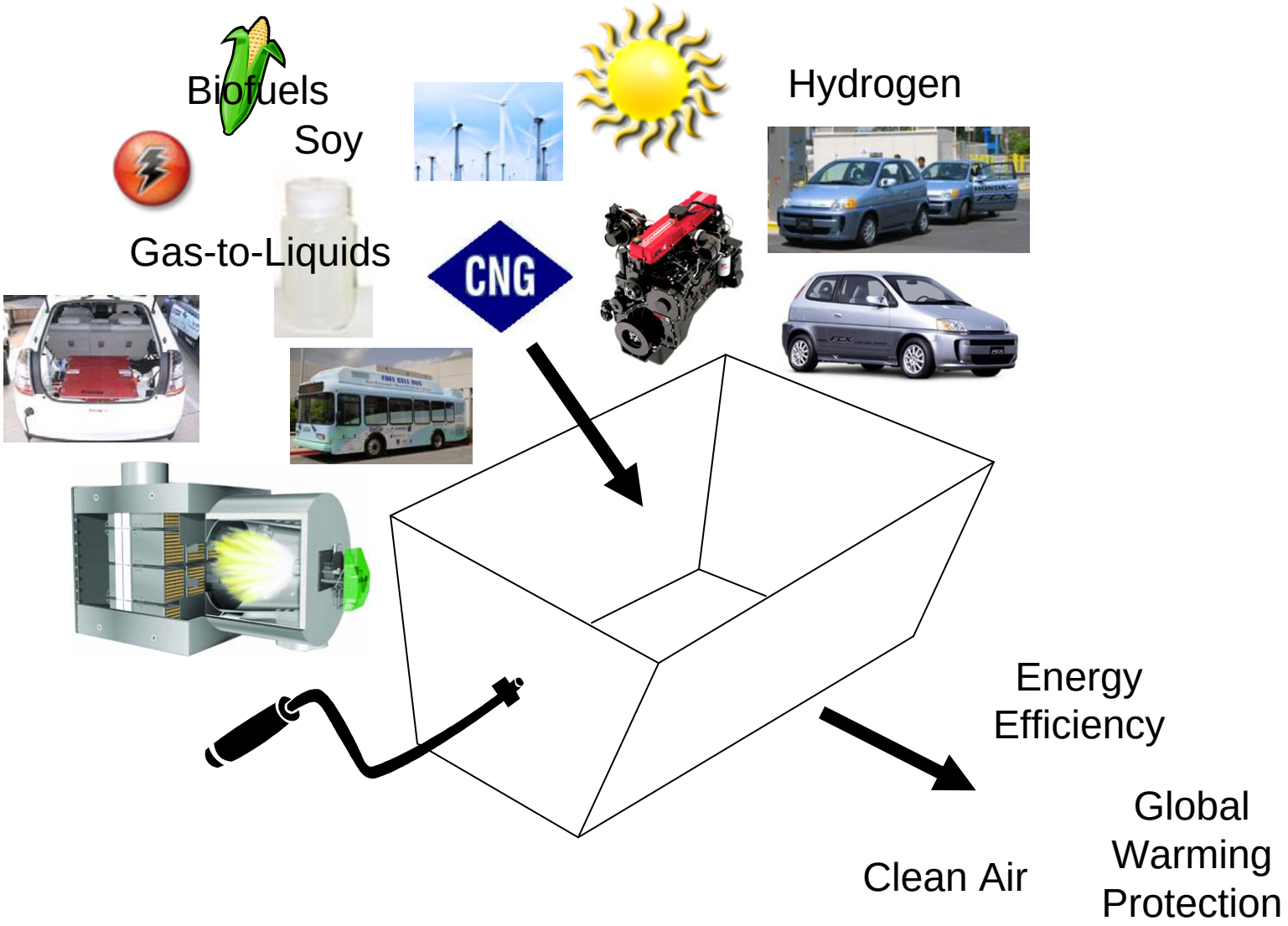
- Today's vehicles are cleaner
- Further emission reductions are needed
- Near-term emission reduction strategies:
  - Optimize / improve current control technologies
  - Encourage development of innovative controls
  - Fuel formulation
  - Incentivize accelerated fleet turnover
  - Local Mitigations: *Restrict truck idling;*
    Restrict operations to clean trucks

South Coast AQMD Approach

Reducing Engine Emissions

- Greater Use of Clean Fuels and Alternative Fuels
- Enhanced Engine Design and Control Technologies
- After-Treatment Control Devices
- Reformulated Fuels and Diesel Fuel Alternatives
- Advanced Technologies

The Clean Fuels Toolbox



Advanced Technologies

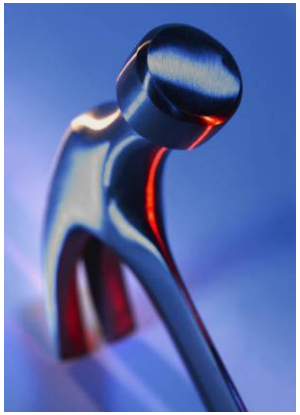
Near-Term

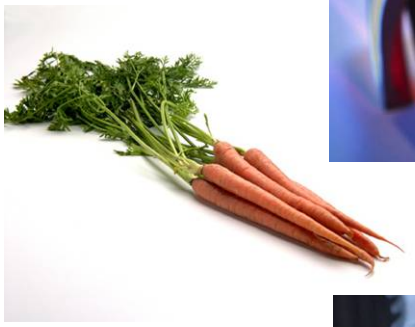
- Aftertreatment
- Emulsified Diesel
- HD Natural Gas Engines
- Natural Gas Fueling Infrastructure
- Advanced Diesel Engines
- Hybrid Vehicles (Plug-in & Hydraulic)
- Gas-to-Liquid Fuel
- Renewables/Biofuels
- H_2 Technologies & Refueling
- Fuel Cell Vehicles

Longer-Term

Approaches to Reducing Emissions

- Regulatory Actions
- Economic Incentive Programs
- Advancing New Control Technologies





SCAQMD Fleet Vehicle Rules

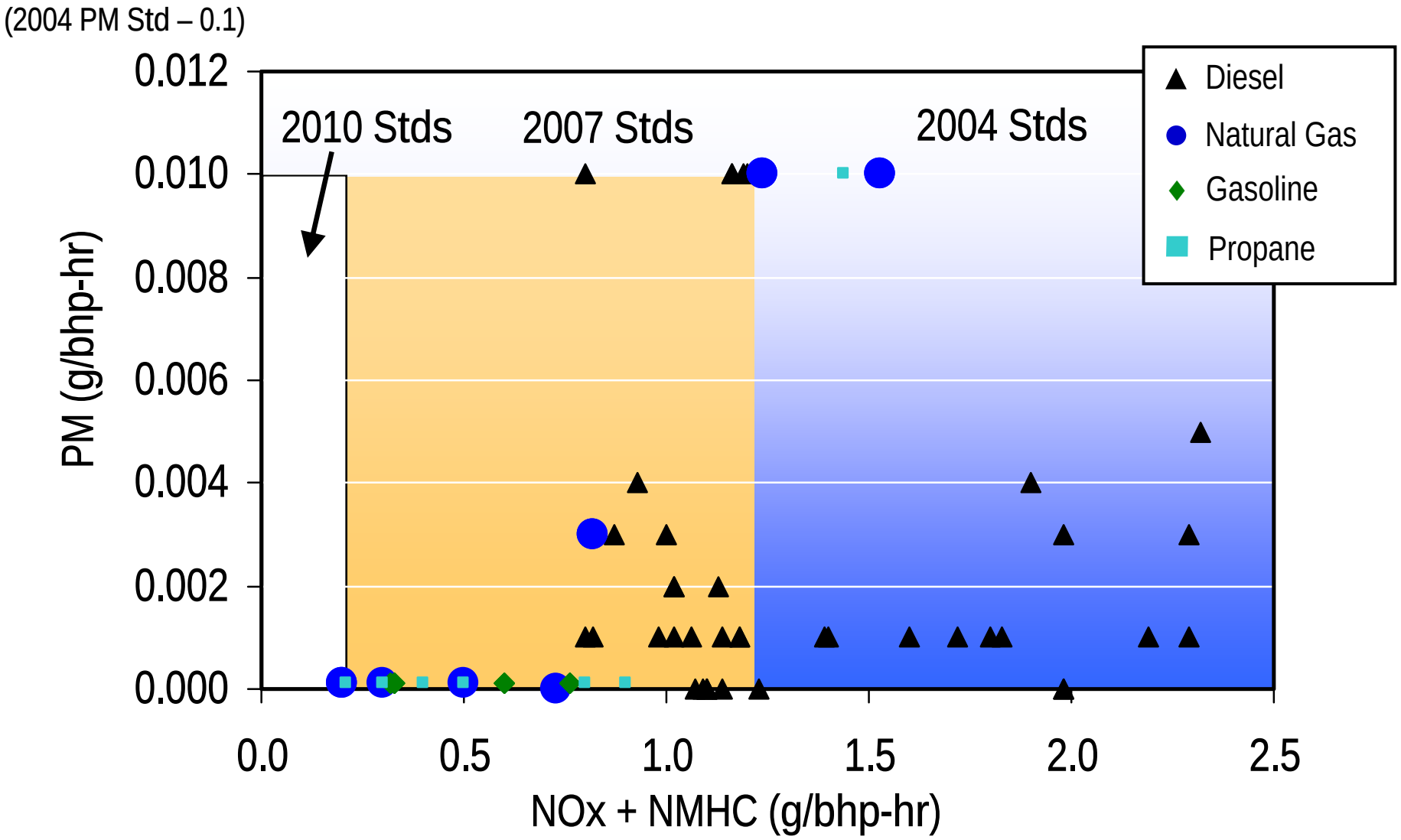
- 7 Rules Covering Public and Some Private Fleets
- Purchase Cleanest Vehicles Available
- Alternative Fuel Application Niches
- Need for Feasible Implementation
- Long-Term Perspective

Rule Compliant Engine Availability

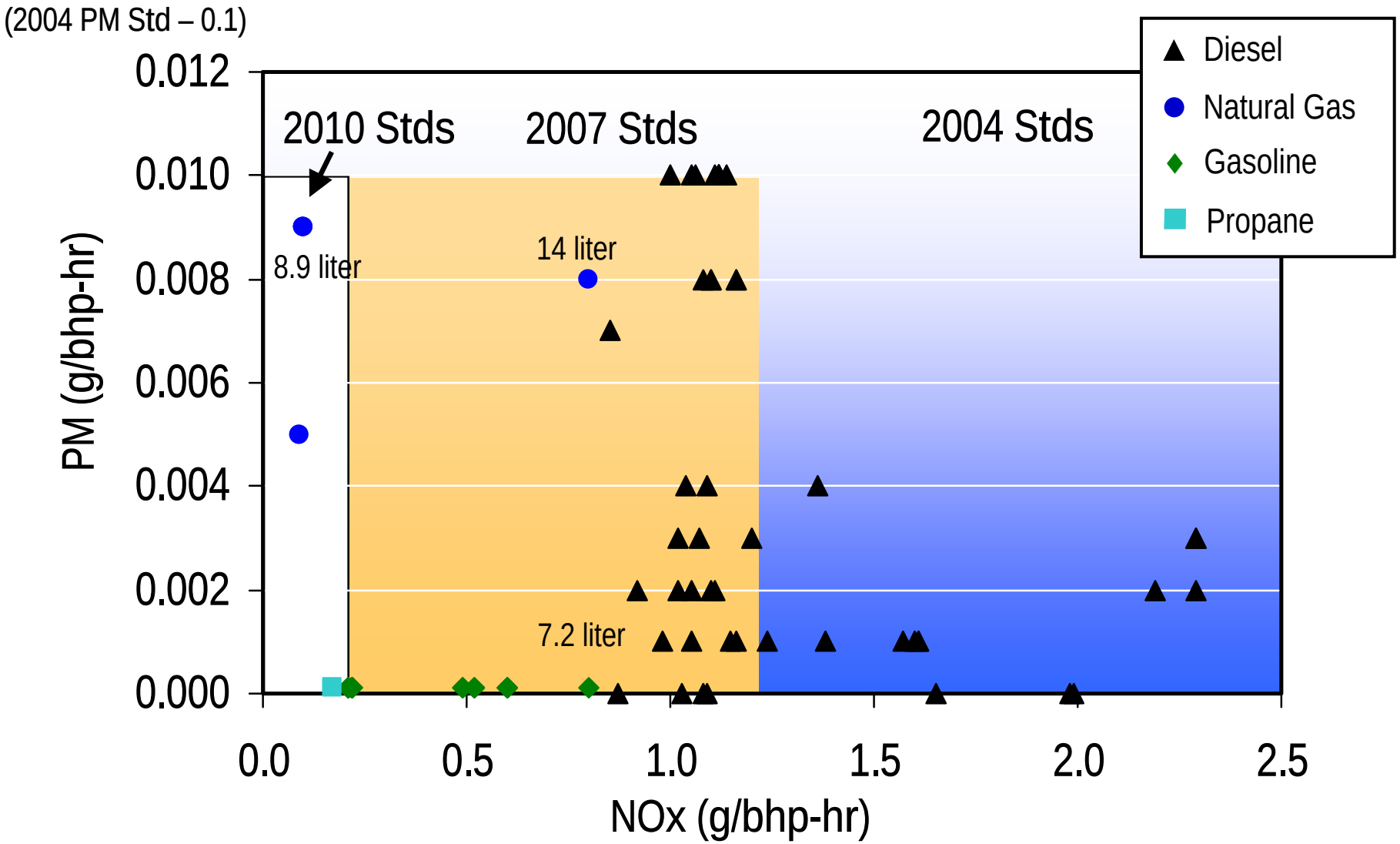
Engine Technology Advancements

- Natural Gas Engines Certifications Below 2007 NOx Emission Standard (Several at 0.6 g/bhp-hr or Lower)
- Introduction of Natural Gas/Diesel Engine for Class 8 Trucks (33% Cleaner Than 2007 NOx Standard)
- Re-Introduction of LPG Engine Certifications (Below 2007 Emission Standards)
- Particulate Control Devices Integrated into New Diesel Engines (Beginning 2007)
- Potential Hybrid Systems

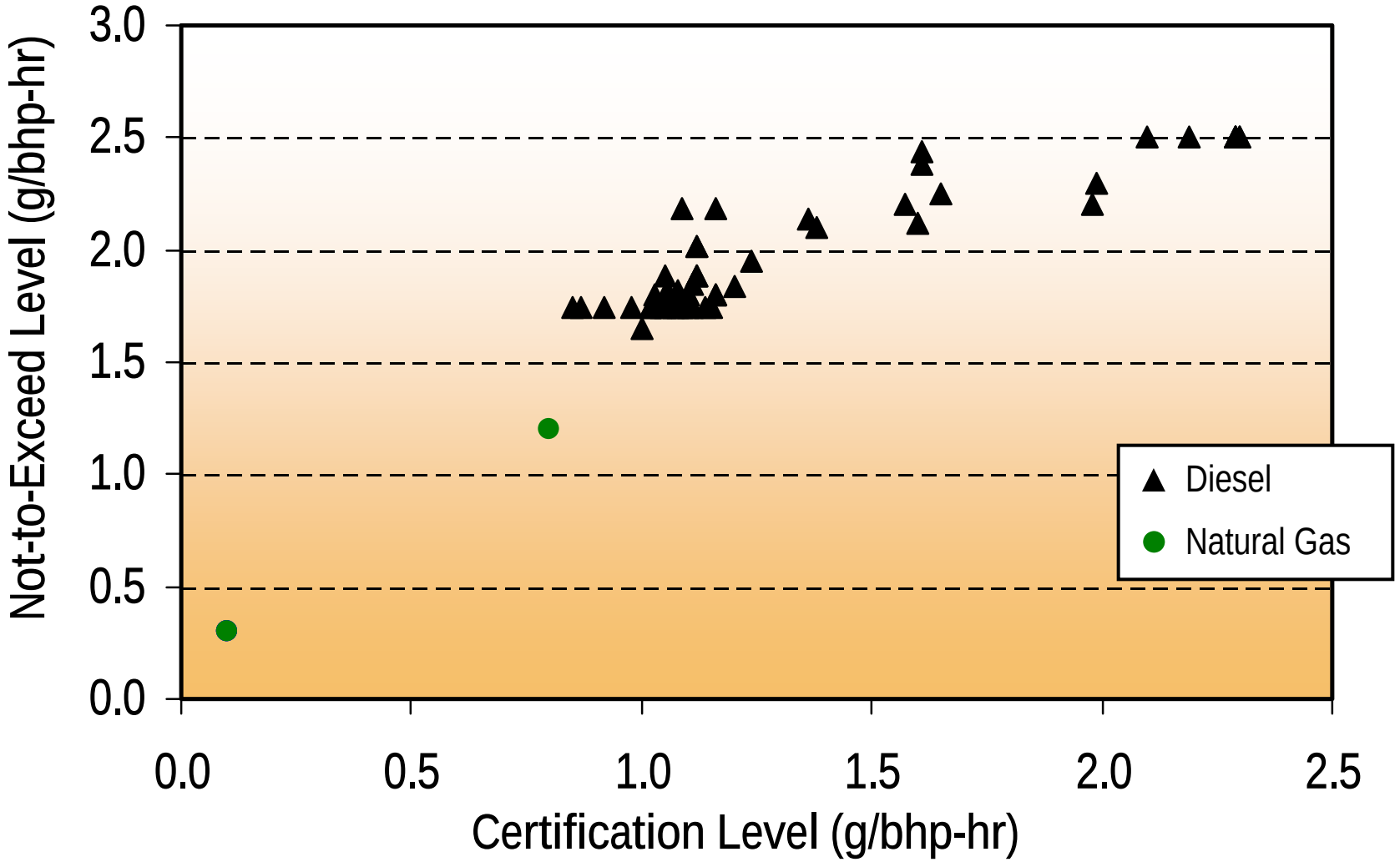
2007 Heavy-Duty Engine Certifications



2008 Heavy-Duty Engine Certifications (as of March 14, 2008)



2008 NOx Heavy-Duty Engine Certification Levels Compared to Not-to-Exceed Levels



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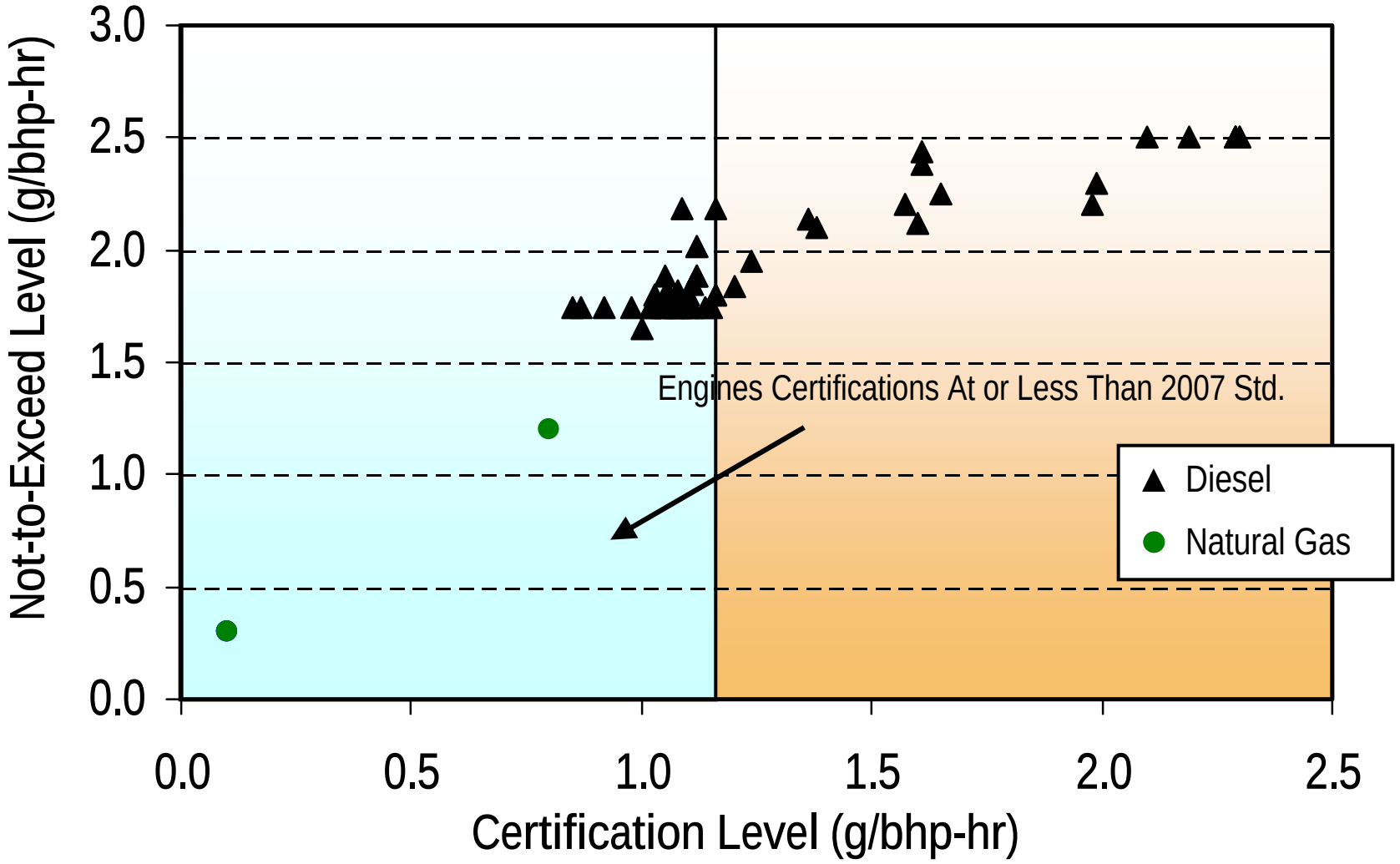

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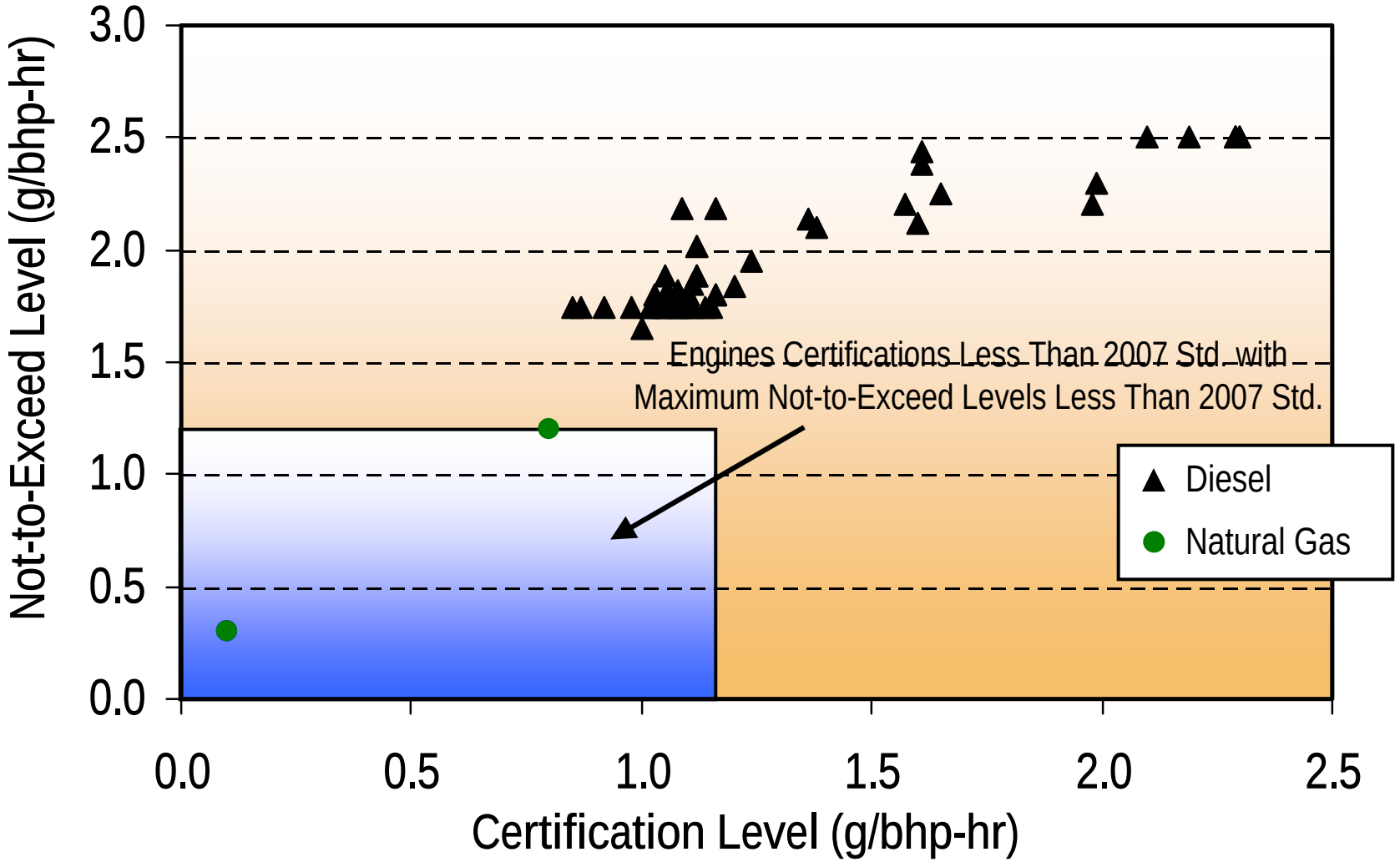


Natural Gas Engine Availability

- One Light-Duty Vehicle – American Honda
- Currently Two U.S. Manufacturers – Cummins Westport (8.9L) and Westport (14.9L)
- Autocar, Kenworth, Freightliner, Peterbilt – Offering Natural Gas Products
- Blue Bird, ThomasBuilt – Integration of Natural Gas Engines
- Several Upfitters Providing Conversions
  - BAF Technologies (Crown Victoria, E450)
  - Baytech (GM Engines)
  - Emission Solutions (International DT466)

Source: American Honda

Source: Clean Energy

Natural Gas Vehicles Operating in Fleets in Southern California

~ 3430 Light- and Medium-Duty Public Fleet Vehicles

~ 91 Heavy-Duty Public Fleet Vehicles

~ 3691 Transit Buses

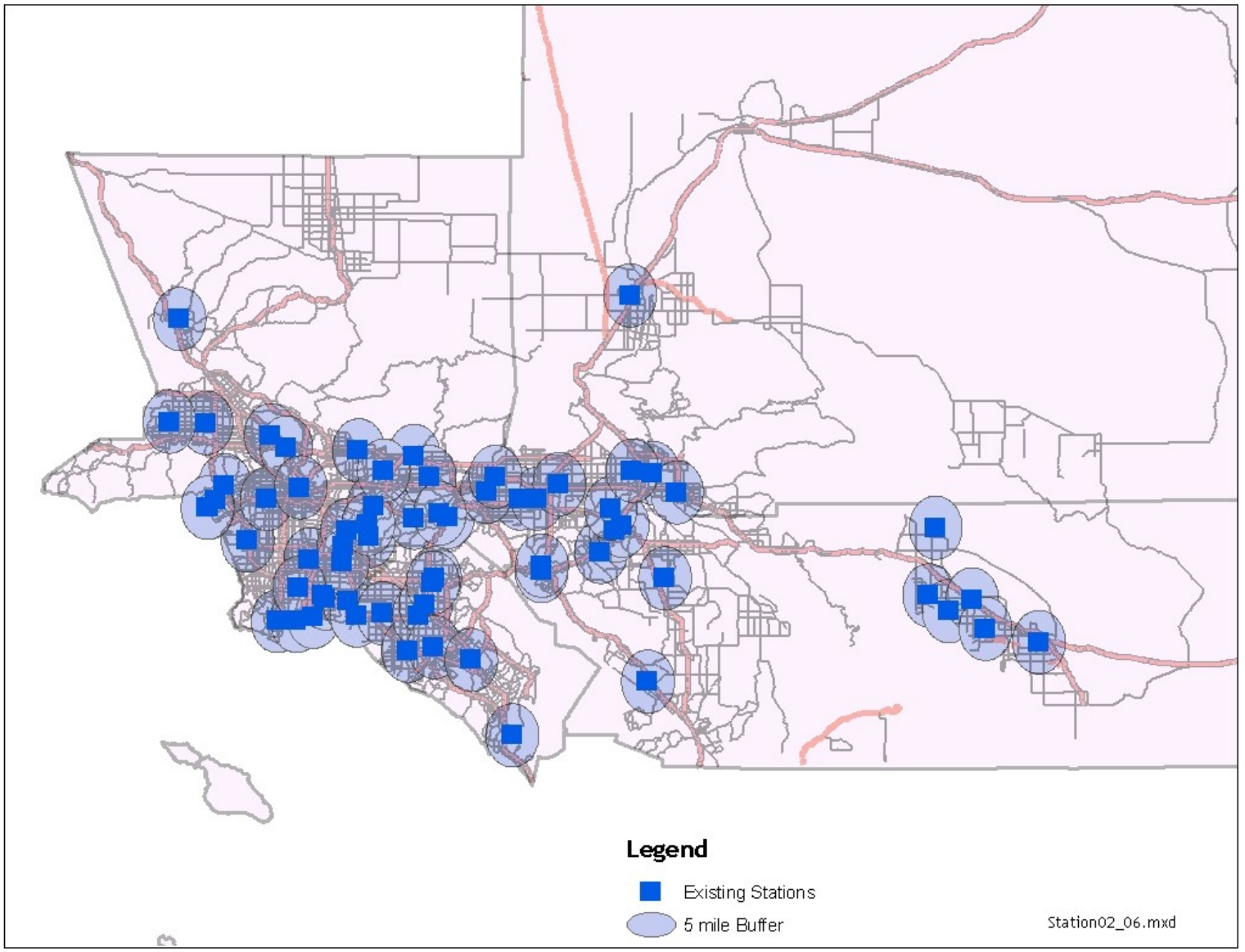
~ 535 School Buses

~ 1390 Refuse Trucks

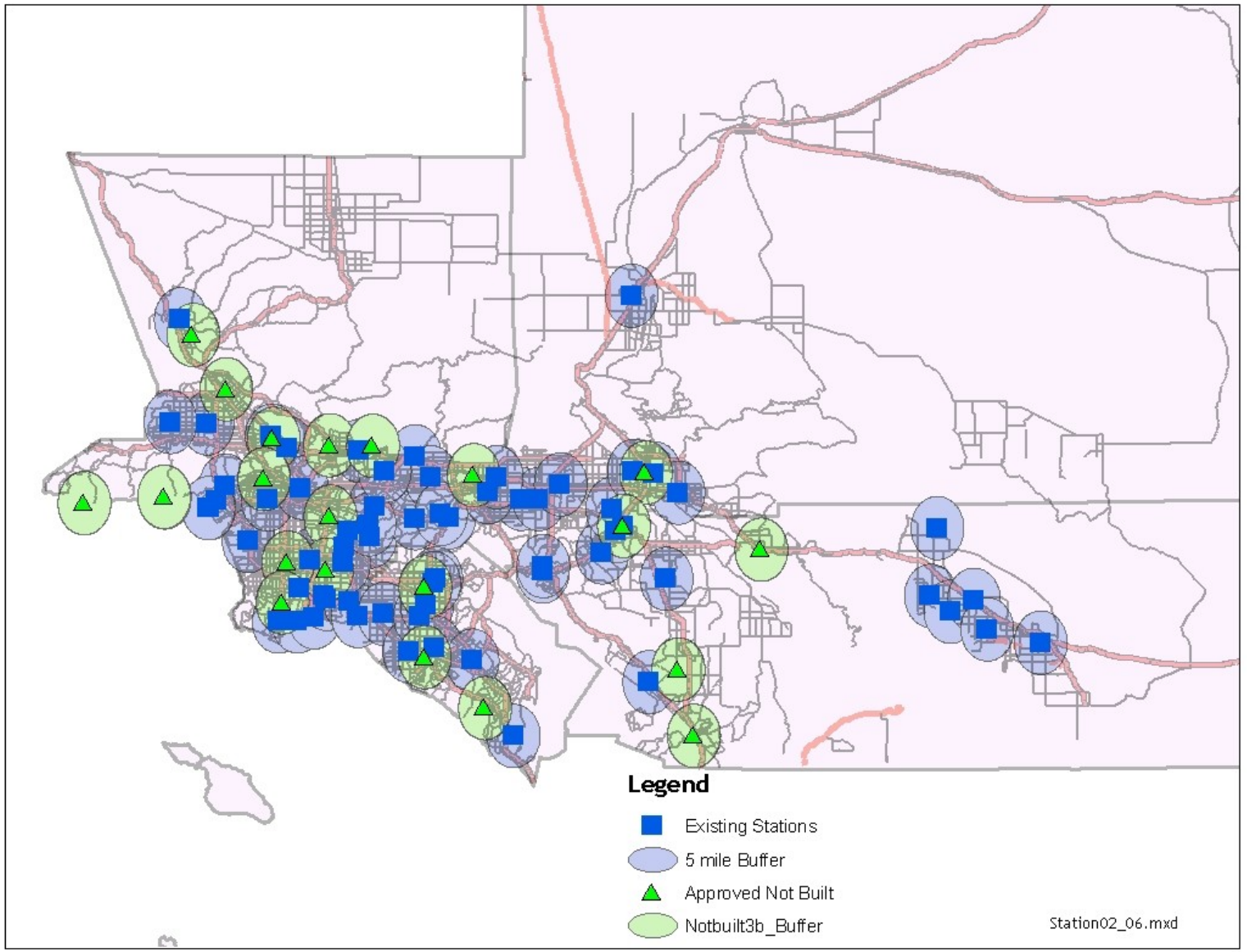
~ 222 Street Sweepers

~ 540 Taxicabs and Airport Shuttles

Existing Natural Gas Stations



Existing and Planned Stations



SCAQMD Incentive Funding Programs

- Carl Moyer Program for Heavy-Duty Vehicles
- Proposition 1B, AB 118
- Lower Emission School Bus Replacement Program
- Air Quality Investment Programs
- Enforcement-Compliance Settlement/Penalty Fees
- Regulatory Incentives Programs for On-Road and Off-Road Mobile Sources

Source: Port of Los Angeles

Principal Policy Drivers

- Momentum is critical
- Need sure, near-term emission reductions to reduce health impacts and cancer risk, and to avoid additional economic harm to region
- Historic under-estimation of mobile source emissions - Must exercise due precaution
- Awareness of necessary niche flexibility and need for compliance options
- Climate Change Initiatives

Take Away Messages

- Health impacts are severe
- Emissions are the problem
- Technological solutions are available
- Must act immediately on all levels
- Progress demands persistent dialog and persistent responsiveness

Thank you